

**INTEGRAL TURBINE COMPOSED OF A CAST SINGLE CRYSTAL BLADE
RING DIFFUSION BONDED TO A HIGH STRENGTH DISK**

ABSTRACT OF THE DISCLOSURE

A lightweight high temperature bladed turbine disk intended for use in gas turbine engines. The bladed disk comprises a cast integral ring of single crystal airfoils with the primary and secondary crystallographic orientation being the same for each airfoil. Low-angle mismatch boundaries are present in the endwalls that couple adjacent airfoils. The cast ring of single crystal turbine blades is diffusion bonded to a high strength equiaxed disk. The resulting single crystal bladed disk is endowed superior performance, temperature capability, and lower weight and cost, relative to conventional turbines composed of individually cast single crystal blades, which are mechanically inserted into machined slots in the disk, or lower strength cast equiaxed blade rings that are diffusion bonded to a high strength turbine disk.